REMARKS

The reference to an IDS filed February 5, 2002 has been noted but is not understood in that no IDS was filed in this case until the end of September 2002. It is believed that this paragraph was inserted in the Office Action in error and should be ignored.

It is respectfully submitted that the claim objections can be withdrawn because claims 1 and 7 have been amended suggested by the Examiner.

Original claims 1 and 4 have been combined and claim 7 has also been amended to reflect this change. Claim 4 has been amended to specify that the flow cell is a thin layer flow cell and a new claim 12 has been submitted to claim the use of such a thin layer flow cell in the method. As pointed out on page 6 of the application, the flow cell is oriented so as to intensify the interference color of the pigment by the use of such thin layer cells.

The rejection of all claims under 35 U.S.C. 103 over Asaba in view of Abu-Shumays is respectfully traversed. The Asaba reference simply teaches that goniospectrophotometric measurements of gonioapparent materials can made to quantify color. The Abu-Shumays reference teaches the use of a flow cell packed with an absorbent in order to permit fluorescence to be measured. These two references, whether considered alone or in combination, do not teach or suggest the present invention.

In evaluating the claims pending in this application, it is important to recognize that they relate to controlling the color of an interference effect pigment (and an apparatus used for that purpose). Such effect pigments, also known as pearlescent pigments or nacreous pigments, are based on platy substrates which have been coated with a metal oxide layer or layers. They exhibit a pearl-like luster as the result of multiple reflections and refractions of light as it encounters the various layers which constitute the pigment. The interference effect pigments are made by forming a hydrous layer on the substrate followed by calcining, but the apparent color of the hydrous and calcined layers need not be identical. The color generated is a function of the optical thickness of the coating, which

can change during calcining. Optical thickness is a function of the refractive index of the coating and its physical thickness, while the physical thickness is, in turn, a function of the coating process parameters and conditions. Control of product characteristics is also further complicated by the fact that the color changes rapidly as a result of our reaction rates and even further, because free particles of the coating unattached to the platy substrate can form and affect the apparent color.

Beyond the foregoing, when the effect pigments are used, the compositions in which they are incorporated are generally processed such that the individual effect pigment particles are similarly oriented in order to achieve the maximum desired appearance. When the pigment is made, however, the plating particles may or may not be oriented and therefore the visual appearance of an in-process material can be misleading.

Because of all of these considerations, a simple viewing or measuring of the in-process material is not particularly reliable. To accurately monitor color, it would be necessary to obtain and dry a sample of the pigment, suspend it in a coating carrier and coat a color evaluation substrate before evaluating the color but this is clearly impractical and time consuming. As a practical compromise, therefore, interference effect pigment processing is performed with a simple subjective visual observation of the pigment dispersion as the hydrous coating is being formed on the substrate by experience operators while trying to maintain the process conditions as close as possible to predetermined parameters.

The present invention is based on the recognition that the assessment of color of an in-process interference effect pigment can be achieved with a reasonable degree of reliability if the evaluation is made in a flow cell configured to provide a macroscopic alignment of the effect pigment platelets. When such a flow cell is used, the alignment of the effect pigment platelets provide an oriented platelet collection to the spectrophotometer light beam and thus improve the amount of reflected light which, in turn, provides a means to preferentially measure the reflected interference color over the absorption color.

It will be appreciated that there is nothing in the references cited which teach or suggest using a flow cell adapted to orient the interference effect pigment sample so that the color evaluation has a reasonable relationship to the ultimate product characteristics which are being achieved. Accordingly, the combination of references do not suggest the invention.

In light of all of these considerations, it is respectfully submitted that this application is now in condition to be allowed and the earliest issuance of a Notice of Allowance is respectfully solicited.

Respectfully submitted,

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APPENDIX A
Version With Markings To Show Changes Made
37 C.F.R. § 1.121(b)(1)(iii) AND (c)(1)(ii)

CLAIMS:

1. Apparatus for controlling color of an interference effect pigment during [its] the pigment preparation comprising:

an interference effect pigment reactor;

a flow cell in communication with the reactor adapted to receive and orient a sample of pigment from the reactor; and

a goniospectrophotometer, interfaced with said flow cell, for evaluating light reflected from pigment in said flow cell.

4. Apparatus of claim 1, wherein said flow cell is [adapted to orient the pigment in said] a thin layer flow cell.

7. Method for controlling color of an interference effect pigment during [its] the pigment preparation comprising providing a flow cell with [a] an oriented sample of the pigment being formed, impinging light on the sample, and comparing a characteristic of light reflected from the pigment with a standard.